

BRAIN SCIENCE PODCAST

With Ginger Campbell, MD

Episode #67¹

**Interview with Dr. Thomas Metzinger, Author of
*The Ego Tunnel: The Science of the Mind and the Myth of the Self***

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INTRODUCTION

Welcome to the free podcast version of Episode 67 of the *Brain Science Podcast*. I'm your host, Dr. Ginger Campbell. Today I am talking with German philosopher, [Thomas Metzinger](#), about his book, [*The Ego Tunnel: The Science of the Mind and the Myth of the Self*](#).

The transcripts for this interview and all previous episodes of the *Brain Science Podcast* are available at brainsciencepodcast.com.

This conversation is part of our ongoing exploration of the neuroscience of consciousness. Dr. Metzinger is one of the growing number of philosophers who realize that the findings of neuroscience must be incorporated within any contemporary discussion of philosophy of mind. But he also argues that

¹ See the show notes for additional references: <http://docartemis.com/brainsciencepodcast/2010/03/bsp67-metzinger/>

philosophers have an important role to play as neuroscience begins to try to tackle the mystery of consciousness.

In *The Ego Tunnel*, Metzinger attempts to present a model of consciousness that incorporates the most recent findings of neuroscience. He also argues that a credible explanation of consciousness must include real-life human experiences, such as out-of-body experiences and various psychiatric conditions. In fact, as you will hear in this interview, Dr. Metzinger argues quite persuasively that the very phenomena that neuroscientists traditionally avoid offer important clues.

At the conclusion of this interview I will be back with a few brief announcements, and a review of the key ideas.

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INTERVIEW

Dr. Campbell: My guest today is Dr. Thomas Metzinger, author of *The Ego Tunnel*. Thomas, I'm very pleased to have you on the *Brain Science Podcast* today.

Dr. Metzinger: It's a pleasure.

Dr. Campbell: I think you're the first guest I've had from Germany. I did interview [Dr. Robert Schleip](#) from Ulm for my other show, *Books and Ideas*. Where in Germany are you?

Dr. Metzinger: I'm at the [University of Mainz](#), where I teach in the philosophy department. But I'm also a permanent fellow at the [Frankfurt Institute for Advanced Studies](#), which is modeled after the [Princeton Institute for Advanced Study](#).

Dr. Campbell: I would love to get to go to Germany someday. I have lots of ancestors from there.

Before we talk about your book, I was wondering if you would share a little bit of your background, and then tell us why you wrote this book.

Dr. Metzinger: I studied philosophy in Frankfurt, a city where I also was born. I took my PhD there. I've taught, all in all, at eight different universities in Germany. I spent a year at [U.C. San Diego](#). And I now hold a chair for theoretical philosophy—that's mostly [philosophy of mind](#) and [epistemology](#)—at the [philosophy department](#) in Mainz.

I also coordinate a research group there which deals with [cognitive enhancers](#) and [neuroethics](#)—a brand new discipline that looks into the applied ethical issues with new technologies coming out of neuroscience. So, I've always had a strong focus in an area we call [analytical philosophy of mind](#)—something that is also very prominent and very good in the United States.

But my contribution has been to try and open this pure philosophy of mind to interdisciplinary cooperation. That is, I am also sort of a cognitive scientist. I have, for more than two decades, intensely talked to neuroscientists. It has gotten to the point that I actually design the experiments myself.

So, I cooperate very strongly with people also researching the mind, but in empirical fields also—in artificial intelligence, and so forth. I try to build a bridge between these philosophy of mind issues and ethical issues.

That's where I come from. And this popular book, I basically got bored a couple of years ago and thought I should do something else. And I tried new things. One of them was to create a three-volume textbook for students. Two volumes are out; the third one is coming in April.

I wanted to try to write a book that is accessible to normal people—to an interested educated lay audience—which combines just those issues in the field of consciousness research of which I think these are the important issues everybody should know about. So, it's a combination of ethical and anthropological questions with these general issues: like what is a conscious self, what is consciousness in the first place, what is the relationship to the brain, and so forth.

We scientists, professors, and tenured professors live off taxpayers' money. We also have something like an obligation to explain to those people that pay our salary what actually is perhaps critical, or dangerous, or what is especially interesting about all this new research that's happening in this field. And it's just an attempt to communicate some of these results.

Dr. Campbell: In a way what I'm doing is very similar—although I'm not doing it on the taxpayers' money. But I agree that there's a need for scientists to communicate with the public. And that's one of the things I try to do with my podcasts, is make an avenue to promote that communication. Some of my listeners will buy your book; some of them will just listen to the podcast. But at least those people will get the main ideas, even if they don't read the book.

Dr. Metzinger: Right. Hopefully.

Dr. Campbell: Thomas, since your book is about the nature of consciousness, I would like to start out by asking you the same question I've asked many of my guests. And that is, what is your definition of consciousness?

Dr. Metzinger: That is a big question, and it has many answers. In philosophy of mind there are three major problems: One is the mind-body problem. What is the relationship—the causal relationship, perhaps—of the mind to the brain?

Then, something we call intentionality; that is, the question, how do brain states, mental states, manage to refer to something? How can they get this mysterious

property of ‘aboutness’—of being about something else? What does it mean that our mental states have a meaning?

And then, the hottest topic in the last 15 years is the problem of consciousness. Why does this feel like anything at all, from an inward perspective? How does all this subjective quality in our conscious lives come about? And is that a natural phenomenon? This pure subjective inner way—what it is like to go through conscious experiences—is that something that is open to scientific research, or is it not?

I’ve always been a big fan of this problem of consciousness. It got to the point that I actually founded the first scientific society—the [Association for the Scientific Study of Consciousness](#)—in California 30 years ago, with a number of friends. And this society is now flowering. I even presently have the burden to be the president of this society for a year.

So, what we have now is a historically-new situation. About 15 years ago the problem of consciousness was slowly rising. It got more and more attention in science. The first people had the idea that now we can tackle this in a rigorous and systematic, no-nonsense way.

But still, many of the prominent neuroscientists thought this was something they didn’t want to be associated with. I learned new words from my American friends. One word was ‘flaky’—I didn’t know what that was. Another word I learned was a ‘CLM’—a career limiting move.

Now it is just the opposite. Every neuroscientist who wants to participate in the debate needs something on consciousness in their research profile. It’s all the rage. In the mid ‘90s the first prominent neuroscientists—people like [Wolf Singer](#), [Christof Koch](#), and [Francis Crick](#) at U.C. San Diego—accepted this as a target for research that was now ripe for attack.

And, of course, this was greeted and observed with great interest in the philosophical community, because it's actually our problem, and we've been thinking about it for centuries. And now we have this very interesting new situation that there is this mixed research community: cognitive scientists, neuroscientists trying to tackle the problem, and philosophers trying to make a contribution by laying conceptual foundations, and so forth.

So, the answer to your question is it is not one problem, it's a whole bundle of problems. One is, for instance, what philosophers call the 'unity of consciousness'—the problem of global integration. If you wake up in the morning and you become conscious, then one single world appears to you.

Why is it one? If the unity of consciousness experience gets lost, you usually have a serious psychiatric illness. It's an achievement in its own right that we live in one world when we're conscious—in one unified situation. This problem is so simple that most people overlook it.

Another example is what is a lived moment—this experiential fact that you are now present. There's not only this multimodal scene—the room you're in, the sounds you're listening to—but there is a representation, not only of space and objects, but of time. You are located in a temporal order—there is a past and there is a future—but consciousness is always now. The 'nowness' of it all; that's another problem that needs to be solved.

I'm, of course, as a philosopher, a fan of the biggest of them all. I think the most difficult problem is why is this subjective? What does that mean? It means that, as a target phenomenon for scientific research, consciousness is unique, because it is always tied to an individual first-person perspective. It is you who are experiencing all this. It is tied to a subjective point of view.

Chemical states, physical states, neurobiological states, neurocomputational

states in your brain, they don't have that property. They can be described from the outside—as philosophers say, from the third-person perspective. We can do objective science about neurocomputational properties of the conscious brain, and so forth. That's not a principal problem.

But then there's this mystery that they're always someone's experiences. And in the moment you say that, you flip from the third-person perspective into the first-person perspective. We want to know what my experience actually is. And that is something we haven't properly understood.

Science always deals with publically observable objects. But my very own sensation of brain, or my very own feeling of happiness and relaxation, is not a public object. It is, in a sense which we haven't fully understood, subjective. That's the problem I'm interested in.

Dr. Campbell: I guess I was really wanting to start with the working definition that you gave in your book. Why in the book did you pick the phrase “consciousness is the appearance of a world” as your working definition? I'm going to assume it's a working definition, since that's the way you defined it in the book.

Dr. Metzinger: For a popular accessible book I needed a simple working definition—and “the appearance of a world” is just that. It happens when you wake up in the morning: a world appears to you.

It happens when, from a phase of dreamless deep sleep, you enter a REM phase and you start dreaming: a dream world appears to you. If you have fainted and you wake up again, or if you wake up from anesthesia, the world appears again. If you are not conscious, you do not know that there has ever been a world, that there is anything like a world—or even yourself.

This term, ‘appearance,’ is especially important. It's not only that being

conscious means to live in a world—to live in a unified situation. The core of the problem is what philosophers call ‘phenomenal consciousness.’ And the word ‘phenomenal’ exactly means that—how it appears to you from a subjective point of view.

So, the problem of consciousness is, imagine you see a red apple lying in front of you. It appears to you as if there is a red apple on the table in front of you. Now take exactly the same subjective feeling, but you’re hallucinating—there is no apple on the table.

What we need to understand in consciousness is what a veridical perception and what a hallucination have in common. That common element—the redness, the roundness, how the apple appears to you, how the world appears to you—that is the actual question; not if the world is out there, or if you have proper knowledge of your environment. The core of the problem is the appearance as such.

Dr. Campbell: So, even if you’re hallucinating, that’s still a form of consciousness. That’s what you’re really interested in, is how that is happening, not what’s out there.

Dr. Metzinger: Right. So, of course, our mental states give us knowledge, if our perception is a correct perception of the outside, and then we are somehow in contact with the world. But we can have exactly the same conscious feel—the same appearance—even if we’re dreaming or if we’re hallucinating. The problem of consciousness is about this appearing: the feelingness, the qualitative content of it, not if it’s veridical.

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The *Brain Science Podcast* is sponsored by [Audible.com](https://www.audible.com), which is a great place to download audiobooks from many different genres. The Audible library includes many titles that have been featured on both of my podcasts, including *The Ego*

Tunnel, by Thomas Metzinger.

If you are new to Audible, you can get *The Ego Tunnel* free by going to audiblepodcast.com/brainscience. Then all you have to do is type ‘The Ego Tunnel’ into the search box, and it will go right to Dr. Metzinger’s book.

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Dr. Campbell: Thomas, what sets *The Ego Tunnel* apart from other attempts to explain consciousness—beside the fact that it’s aimed at a general audience?

Dr. Metzinger: The first thing I have done is, I have put a focus on the self, and I’ve argued that there is no such thing as a self. And I try to show this by some philosophical considerations, and by some experiments I have actually conducted with friends from the neurosciences, myself.

But then, in the end of the book I try also to do something else. I try to widen the horizon and look at the cultural and social consequences all of this may have in the next 20 to 50 years. I try to build a bridge into the ethical issues that are connected to this now booming field of consciousness research. So, actually, I try to do a number of things at the same time.

Dr. Campbell: I also noticed that you put some emphasis on the fact that consciousness is a biological process. Also, you talked about, again, as you just mentioned, the subjectivity. It seems like sometimes people try to separate those two issues, and act like subjectivity can’t be biological. But what else can it be?

Dr. Metzinger: Well, ‘what else can it be’ is, of course, no good argument; maybe we would just have a lack of imagination. Today the general trend, of course, is everybody thinks consciousness maybe cannot be reductively explained, but it is strongly determined from below.

Many philosophers, even if they vary in their opinions, would subscribe to the idea that if all the facts about your brain are fixed at a given instant, then your conscious experience is fixed, as well. So, there's a strong upward determination; there's a strong dependence of the conscious mind on its biological, functional, physical underpinnings.

But then again, the big problem is what is the functional role? What was consciousness good for? If you want to have a fully scientific naturalized story about consciousness—and we don't have it at this point in time; our future is open—the question would be why should this have evolved in evolution?

Why should animals have something like conscious color vision? Couldn't they have acted like machines that analyze wave length spectra? Why should it feel like anything at all? What was the purpose of it?

You just asked about subjectivity, Ginger. And the question would be, what use could it have had for a biological organism to develop a conscious, first-person perspective? What would the causal difference be of a system that has that and a system that doesn't have that? And that's, of course, a difficult question.

I think it has to do with the history of the conscious self. It was good to have a model of yourself as a whole. So, in the very beginning, in early animals it was good if you had a model of your body as a whole. Not many animals probably have that. You could imagine animals that work like insects—just like robots that have no coherent model of the world as a whole, and that have no coherent model of their own body.

And then you could imagine a more advanced class of biosystems that actually have an as yet unconscious, but an inner image of how tall am I, how fast can I run? What will happen if I fall down from that branch? What will happen if I bounce into that wall? Should I pick a fight with this guy, or rather not? Can I

impress this female, or rather not?

So, of course, it was useful to have knowledge about your own body, and it was useful to have knowledge about global properties of your own body, like the overall shape. If you wanted to control this in jumping, fighting, running, then you needed an inner image of your body as a whole.

OK, we can still imagine that. But then the question is, why should it have been conscious? What is the difference between an unconscious representation of the body, and one that really subjectively appears?

One difference seems to be everything that is conscious is something that you can attend to. You cannot direct your attention to unconscious things; it's just impossible. So, animals that would have had a conscious body image could, for the first time, have directed their attention, say, to a wound they had, or an itch, or something like that.

Also, conscious information is all that information we can form concepts about. We can start to think about our bodies—properties of ourselves. You cannot form concepts about things that do not appear to you, that are just not available on this level, where all your faculties can access this information, say, about your body or your memory, at once.

And another very important thing is what scientists call 'selective motor control.' You can very clearly show that being conscious makes you more context-sensitive. But it also allows you to control your own movement—your behavior—in a much more flexible and fine-grained way. You can react to errors, or to challenges of the situation in a better way.

Take a sleepwalker. A sleepwalker—a human being that is unconscious—very likely has an unconscious body schema, a body model, and walks around. Many people think they are safe; as long as you don't wake them up, nothing happens to

them; if a sleepwalker is up on the roof, the worst thing you can do is shout at them and wake them up.

It's actually not true. Sleepwalkers hurt themselves. Sleepwalkers do run into furniture and into walls. Sleepwalkers do fall down stairs. They are not completely safe, like a little child.

Why? Because they are not very context-sensitive. They are more like a simple robot—they walk ahead. Turning a corner is already quite difficult for a sleepwalker. Reacting to obstacles and things like that doesn't work as well.

And if you compare a walking sleepwalker, or an unconscious human patient during an [epileptic absence seizure](#), to a conscious human being, then you see exactly what the difference is which consciousness makes. It's a certain fluidity, a flexibility, a context sensitivity. That could have been one of the advantages in evolution to develop a conscious image of yourself.

Dr. Campbell: That's an excellent example. I really appreciate that.

Would you like to talk a little bit about the idea of the ego tunnel? Is that meant to be really a metaphor, or do you consider that to be a theory?

Dr. Metzinger: I do, of course, have a big theory about consciousness and the self in the background. For instance, in English it's in an MIT Press book called *Being No One*². But for this accessible, easy-to-read book I needed something like a metaphor that captures the spirit of the general idea, so I used this idea of the ego tunnel. So, I think conscious experience, as opposed to what we think, is an exclusively internal affair.

I already said the subjective appearance is just exactly what is common between

² There is also an interesting video of Dr. Metzinger discussing *Being No One* at <http://www.youtube.com/watch?v=mthDxnFXs9k/>.

an apple which you hallucinate and an apple that looks the same, but is really there—a veridical perception. Now, that shows that the colors, the sounds, the smells, all these qualities are just determined internally by something scientists call the [neural correlate of consciousness](#)—that is, the physical counter piece.

The idea is to everything you experience right now—the whole room, your memories, your mood—there is a counter piece in your brain. And there’s also a minimally sufficient counter piece: a very small set of neural functional properties of which it is true, if you have that, then you will have exactly that experience.

And the idea is also for elements in conscious experience—like the specific redness of the apple, or the weight sensation in your body right now—everything will have a neural correlate. So, metaphysically speaking, consciousness is an internal affair. What you see and feel is like the inner surface of a space that is opened by your brain.

This does not mean I’m saying that there is no outside world. There is an outside world. But, as your physics teacher, for instance, already told you in high school, there are no colored objects out there; there are just wavelength mixtures. The green, and the red, and all the colors you experience are properties of the internal models your brain creates of reality.

I mean it gets even worse. If you ask physicists and philosophers of physics, they will tell you there aren’t even objects on any level of reality. If you start thinking about this, then you realize you are actually moving through a model of reality, and conscious experience is, so to speak, Mother Nature’s own virtual reality—much better than anything we create right now with our large computers and [VR technology](#). It was developed millions of years ago. It is a simulated internal space.

Now, the big trick about it—I mean, the really fantastic invention—is that we don't have the feeling of moving inside a purely internal space. We all have the feeling that we are not in our brains, like in a lucid dream, walking through ourselves, as it were.

We have the feeling of being present in the real world. And that is actually a major achievement. You could describe it as a specific illusion, but it is a major neurocomputational achievement of the human brain—the sense of presence as a self in a conscious scene.

I call this a tunnel just to draw attention to the fact that the consciousness of it all—the appearance itself—is an exclusively internal affair. You don't need eyes to have the experience of being sighted. We all know that in dreams we can have the experience of seeing. In principle you could create all this experience for an old philosopher's story—a brain in a vat that was appropriately stimulated from the outside.

All of this doesn't mean that there is no knowledge about the outside world. Of course we have knowledge, and of course there is causal contact to the outside world. But just this one aspect of it—the subjective feeling—is actually an internal affair.

Now, if you look at consciousness as a whole, and you describe it as a tunnel—a dynamic high dimensional tunnel—all the sensory qualities are actually something like paint on the inner surface. It's just that that surface is not like a normal tunnel which you have known before, but it's a high dimensional tunnel.

It has a sound surface, it has a gut feeling surface, and it has even an emotional surface. It has smells and tastes. This is all, so to speak, the very, very thin inner surface of this dynamic process that is going on in your brain while you're conscious.

But the most striking characteristic in this ego tunnel (that's why I coined this metaphor of an ego tunnel) is that there is almost—not always—but almost always somebody there who lives through the experience; somebody who has these gut feelings, somebody who sees these colors.

That, I guess, is the second great invention of Mother Nature. It didn't only create these internal models of reality, which organisms could use to successfully navigate the world, but it also created something like a user illusion.

One way to look at consciousness is as follows: Our nervous system got so complex—much too complex to control—the brain got too complex to control itself. So, what it needed was something like your Windows desktop. It needed a user surface—a simplified model of what is going on there, and what can be done: what can be controlled.

Now, the ego—your conscious self—is the mouse pointer on that desktop. It is the one part of the overall model that tells the animal, 'You are here and now. You are this, and you are in control.' That is how the sense of self emerged.

And that is, of course, another fantastic invention—to portray not only reality as consisting of objects and colors, but as something that is seen by a self. I try to capture this idea by the metaphor of an ego tunnel.

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Dr. Campbell: Thomas, what do you mean in your book when you say a biological organism is not a self.

Dr. Metzinger: All I'm saying—and many people have said this before—is that what we refer to as a self, or the self, is certainly not a thing. It's not a thing in the head, and it's also not a thing outside the physical world in some metaphysical dimension.

There is no such thing as what philosophers call a substance—that is, something that could hold itself in existence just by its own power; something that could stay in existence even, say, if the physical organism vanished. Many philosophers have said that. [Derek Parfit](#) has said that, [David Hume](#) has said that. Buddhists had that point 2500 years ago.

But we're now approaching a deeper and more detailed understanding. Of course we have a conscious self. I don't deny that. We have the conscious experience of being someone. But the idea is that we can explain and predict everything we want to explain and predict about human beings without using the concept of a self, just as scientific psychology has long stopped using the notion of a psyche and a soul as a theoretical entity.

It's just not needed. You can predict everything you want to predict about human beings with simpler theories, with simpler concepts. In the same way, we don't need the assumption of a substantial self anymore. We can explain the emergence of self consciousness, but also intelligent behavior, cognition, all these things, without assuming that there is a thing; a self; the self.

In a first approximation we can say that what we have called the self, or our self in the past is not a thing, but it's a process. And it's a process that's not always there. Sometimes the process is switched on. For instance, when you wake up in the morning, then the system which you are, in my way of speaking, so to speak boots its phenomenal self model.

That is, it activates a conscious image of itself as a whole. You suddenly realize, 'Ah, there's a body as a whole, and I can control it. I can get up. There is global control over this entity I'm aware of now.' And that is the earliest emergence of the sense of selfhood—this availability for global control.

If an animal discovers that about itself—that it can exert global control over its

body—that sense of control is one very important building block for the conscious sense of self. That was, of course, helpful. But it doesn't mean that there is a thing.

There's a certain functional property that comes about in the nervous system. There's a certain image, a representation of yourself as a whole. And, in the case of human beings, that's certainly not only the body; it's also social relationships. There are not only neural correlates of consciousness, there are, of course, social correlates as well.

It has to do with the past. There is an autobiographical self model in most of us—an image of our history, of our past, our childhood, our experiences. Then there is something that's, so-to-speak, cast ahead into the future. We have plans, desires, needs, goals. They are part of this self model, as well.

As this gets richer and more complex, you get the human variety of an ego. But the whole thing is just an intermittent process. In dreamless deep sleep there is no such thing as a consciously experienced self. And in the dream state the conscious self is very different from the self in the waking state.

So, I think we can explain and understand everything we want to understand about ourselves with much simpler conceptual tools. For instance, the notion of a representation in the nervous system.

Dr. Campbell: So, saying that there's no such thing as a self is basically saying there's no thing separate from what our brain and body creates through its processes—no non-physical self?

Dr. Metzinger: That's true. I mean one has to make a very clear distinction here. The existence of a non-physical substantial self always remains logically possible. And it also remains logically possible that we have two selves. And it also remains logically possible that we have two non-physical selves, etc., etc.

The question is what is the minimal set of assumptions we need to make—that's the rational approach, the scientific approach—to understand what we want to understand? All I'm saying is we don't need the assumption of a non-physical self for that. It always remains a logical possibility, of course.

Dr. Campbell: Well, that makes sense to me. I think I was a little bit confused about what you were getting at when I was reading the book. So, I thought maybe some other people might be, too.

You, yourself, have a lot of interest in experiences that neuroscientists as a whole have tended to want to ignore—things like out-of-body experiences and dreaming. I got the impression from your book that you feel any good theory of consciousness really has to take into account these kinds of phenomena. Right?

Dr. Metzinger: Yes. I think if we want to do research about consciousness, we have to take the target phenomenon seriously. And human consciousness is a very rich phenomenon. It has many special cases. We have spiritual experiences, deep mystical experiences. We have a spectra of serious psychiatric disorders where people, for instance, will claim that they don't even exist, themselves—where living people will claim that they are dead, in the so-called [Cotard's syndrome](#).

That is something that is very interesting for philosophers, because we have, for instance, [Descartes](#), who claimed in the seventh century that he knew with certainty about his own existence. And if then there are conscious human beings who claim with certainty to know that they do not exist, that's, of course, interesting. Anybody who has a serious interest in the human mind will take all sources of information.

So, many of these naturally-occurring altered states of consciousness, but also many psychiatric syndromes are important for philosophy of mind, because we

can learn something from them. We can learn what is necessary, and what is perhaps only sufficient. If we know that *A* and *B* usually occur together, and then we can show there are cases where *B* occurs without *A*, and *A* occurs without *B*, then we know something. We know something about the architecture of the human mind.

That is why I have for many years used what I call neurophenomenological case studies. I've looked at simple cases where, after a certain brain lesion, in a psychiatric condition, or under the influence of some psychoactive substance specific contents of consciousness are missing, amplified, and so on. We can learn about the human mind if we take these phenomena seriously, and if we interpret them and analyze them in a sober way.

Here we come to the CLM point again—to the career limiting move. Of course, most people that have an interest in altered states have an interest because they're pushing some metaphysical agenda, they have some ideology they want to defend, or they think these states prove something they have always wanted to believe in. That's not what I'm interested in. I'm interested in what can be separated.

And in this context I've also thought that out-of-body experiences—about which we have reports from all cultures over the centuries—would be very interesting if we want to understand the process by which we experience ourselves as an embodied self: not only as a subject, but as something that is deeply tied also into physical interactions with the physical world around it.

We don't experience ourselves as pure egos. We are human beings with emotions. And we fill a certain volume in space, so there is this bodily sense of selfhood—I occupy a volume in space. But then there's another aspect of selfhood. I am like a little point behind my forehead. I'm like between my eyes—the origin of the visual perspective.

I have this feeling as if I was a little man, sitting behind the windows of the eyes and peeping out into the world. We know that's an illusion. We know we find no little man there. But these are, for instance, two aspects of selfhood—the felt self location, and the position from which you see.

Now, that's almost always integrated. But just in 2007 some Dutch neuroscientists, with direct stimulation of electrodes in the brain, have shown that you can actually move the sense of self about 50 cm to the back and to the left, out of the physical body, while the visual perspective remains constant. That is, you create a conscious experience where the patient looks out of his eyes, but has the feeling he is located outside of his physical body.

For philosophers such experiments are conceptually very interesting, because then we know two things. The feeling self—the bodily self—and the seeing self, which are normally all-in-one, as it were, can be separated. There must be two different functional processes. That's why soul travel and all these reports about out-of-body experiences are also very interesting.

If you could understand how it is possible that somebody sees their own body from above in an operation theater, after a serious accident, during a marathon run, or at night—from a perceptually impossible position you see your body from the outside, but still have the feeling you, the self, the locus of thinking and attending, is up there hovering above—if we could understand this mechanism, we would learn something about the different layers of the conscious self.

I have had some of these experiences spontaneously as a young man, a quarter century ago. So, I had an interest in it, but I saw that almost all of the literature was terrible crap. There were three very solid psychological studies by [John Palmer](#) in America, [Susan Blackmore](#) in England, and [Harvey Irwin](#) in Australia. And all the rest was just New Age nonsense—just people who wanted a proof for the afterlife.

Dr. Campbell: That was before [Olaf Blanke](#) came along.

Dr. Metzinger: That's right. So, I had written about out-of-body experiences, ruining my reputation—in this MIT book, for instance, *Being No One*—and why I thought they were important on theoretical grounds: To understand what a first-person perspective is, you have to understand what the simplest form of selfhood is.

And then Olaf, for the first time—he made a big splash in 2006³—caused something very much like an OBE in a young patient in Geneva in the hospital. Preparing for surgery, you have to test some things out with an electrode in the awake patient.

Then for the first time a number of us had the feeling, now we have a grip on the phenomenon; now we know it can be caused by an electrode in the brain with a very local stimulation. And then we set up a research program together. So, I'm in there as a philosopher. And they have a fantastic lab. And there are other groups in Sweden and England who are doing all this.

There's this famous [rubber hand illusion](#), which all your listeners can try immediately at home if they have a rubber glove or a rubber hand they can put on a table, and put their corresponding hand under the table. Can you explain this to people on the show—how to make that experiment?

Dr. Campbell: Sure. You have a great explanation of this in your book, I think around Page 4. Basically the idea is that your real hand is hidden, and all you can see is the rubber hand. The rubber hand and the real hand are stroked by a brush or a Q-Tip simultaneously. Within a few strokes, you begin to have the illusion that you can feel the rubber hand being stroked, instead of your real hand.

³ I am not sure if this date is correct. The first reference I found was Blanke, et al., "Stimulating Illusory Own-Body Perceptions," *Nature*, 419:269-270 (2002)

Dr. Metzinger: I'll just take it from there. In 1998 the famous rubber hand illusion was discovered. Here you have a typical example of a philosopher talking to a neuroscientist. I went to my friends and said, 'Listen, we need a whole body analog of this. We need a whole body misidentification, just like the rubber hand illusion.'

And as usual—it's the tragedy of my life—my friends in the neurosciences said, 'Ah, that's a good idea, Thomas, but it's technically not feasible. Sorry, we can't do that experiment, because you never see yourself from the outside.' Then I mumbled something complicated, philosophical, and said, 'You just go one meta representational level above. It must be possible. You have something like a simulated body.'

And then they said, 'Ah, wait a minute. We have a very good virtual reality lab at our university.' So, what we did was you get goggles on, and you are in a virtual reality. You see a simulated room, and a camera films you from behind. Then something called a 3D encoder takes that camera image and inserts it into the virtual reality you see through your goggles.

So, you have an experience you've never had before. You see yourself standing three yards in front of you. Then the PhD student comes, just like in the rubber hand illusion, and strokes your whole back synchronously. And you see, because you're standing behind yourself, how this avatar—this virtual other self in the simulated reality—is being stroked in real time.

What we discovered happens for many people is that suddenly they get a strong sense of awkwardness. Then they get a sense of drift. They get a feeling of being pulled toward that avatar. And some people actually, so to speak, jump into that computer-generated model of their own body. That is, they suddenly go 'whoa' and identify themselves with that virtual body they see in front of themselves—their own body.

Now, it's important (philosophers are the conceptual police) to understand that this is not an out-of-body experience, because during that experience you don't see through the eyes of an avatar. You keep seeing, so to speak, as if you were seeing out of your goggles. Of course, it's more complicated.

Dr. Campbell: Would this be more like what happens when you learn to use a tool, and you begin to feel the tool's extension of your body? Would it be closer to that?

Dr. Metzinger: Well, that's an interesting point you're bringing up. We know a number of things. We know the rubber hand illusion. We know that every healthy person (every one of your listeners can try this out) if you take a stick, and you blindfold your eyes, and you just try to walk with the stick like a blind person, after less than 30 minutes you get tactile sensations in the tip of the stick you're using.

And experiments in monkeys have shown that when they use a rake to reach for a food pellet, or a raisin, or something that is out of reach for them, the representation of the rake, of the instrument, is embedded into the representation of their body in the brain. That is, we have the self model, and when we use a tool, we can do this because we embed it into a control hierarchy, so to speak. We fuse those two images in our brains.

By the way, that's a very important point about the evolution of tool use. You needed—at least I claim—a specific kind of self model to be able to use tools. That is why we humans are so much better than chimpanzees. It's not the genome. It's the self model that makes the difference from the ape to the human being.

In any case, in that line, the point you just brought up, you could say the avatar we are offering to our subjects in cyberspace is something like an opportunity for

something to identify yourself with. But it's not a tool (although we're doing experiments like that, as well) that you actively use. In the original experiments you were just a passive observer watching your own back being stroked.

And that's, of course, a value of these experiments, because it's a very simple, as neuroscientists say, bottom-up process. It's a multi-sensory integration process that leads to this sudden experience, 'Oh, I am this'—this experience of identification, so to speak; this bodily gut level identification of, 'I'm not here, I'm there. I am in the avatar in cyberspace.'

But an out-of-body experience would be something different. An out-of-body experience would mean that you could see out of the eyes of the avatar, and it would mean that you could also control this second body model. So, what we have created, technically speaking, is just a full body illusion. It's a new kind of illusion, where you identify with another body.

So now, of course, the world press was hunting us for 48 hours. After this was published we all had to fly to a press conference in London, and then all those journalists overstated the case, and everybody thought, 'These guys have got it. We're going to enter cyberspace, like through the screen, into an avatar. We're finally going to have good video games.' This is all a lot of nonsense. This is an exaggeration.

Why? What you can, of course, do is a set-up where, with the motion of your own body, you control a virtual body. So, you would wear something like a diving suit, and you have these little light sensors everywhere, and you have 18 infrared cameras filming you. It all goes into the computer. And then you can walk around, and you can move 1, or 16, or 256 body images in a virtual world. That's not the problem.

The problem is that you cannot jump into any of these bodies because—I'm

putting it simply now—your own gut feelings, your own movement sensations, they hold the soul back, so to speak. They anchor it in the physical body. Do you understand the point? In a totally passive condition you can briefly create this effect of jumping over and identifying with something else. As soon as you start to physically move, you're locked in a physical body again.

Now, if we think back to these naturally occurring out-of-body experiences that yogis have, or some epileptics have during a seizure, or people after an accident have, in these situations the body is typically paralyzed—like in sleep paralysis, or under anesthesia—and the brain is cut off from somatosensory input. You are just body-blind.

In that situation, if your body model is activated, it's not constrained by all these terrible, often painful inputs from the physical body. That is why you can control it freely. You can control it in a lucid dream, or in a willful out-of-body experience. You have volitional control over that conscious self model because this high band width input from the physical body doesn't constrain it.

There are even some neurologists who have very interesting speculative hypotheses. They say that there could be something good about an out-of-body experience. That is, people, say, in combat or mountaineering, who've had that in an emergency situation always report an exquisite mental clarity in the out-of-body state.

So, the idea is you could have something like a division of labor in the brain. You push away all the terrible stress signals, the pain signals from your body, into one unconscious corner, and you collect all these higher faculties—conscious thought, memory, attention—in some confabulated self model that is pain-free, and is constructed as if it was hovering above. So, maybe that's even some kind of a healthy emergency reaction in some cases, when you have an out-of-body experience.

[music]

I want to take a moment to thank those of you who are supporting my work with your [donations](#). Your ongoing support covers most of the expenses of producing the *Brain Science Podcast*, including making transcripts. But, as I mentioned in the announcement that I posted last week, you represent only a tiny percentage of *Brain Science Podcast* listeners.

Don't forget that you can also support the show by purchasing the *Brain Science Podcast* iPhone application. This allows you to stream any episode, and to read episode transcripts right on your device. Just go to brainsciencepodcast.com to learn more.

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Dr. Campbell: It sounds like your experiments indicate that our sense of—you were talking about your sense of yourself as your body—that it's related to both our sensory inputs and our movement (our motor inputs), because both of those are usually missing when you have an out-of-body experience.

Dr. Metzinger: That is absolutely correct, Ginger. One thing many people overlook is we don't only have colors, and sounds, and everything, from the outside, but there is one perceptual object from which the human brain can never run away, whatever it tries to do.

You can look the other way and not see this red apple on the table, but your body is a very special perceptual object. It always bombards the brain with a lot of information from the muscles, from the tendons, from your guts; blood pressure, body temperature, weight sensation. A very important aspect is also, in out-of-body experiences, the vestibular organ—the sense of balance.

All these things feed automatically into your body model, and they hold it—firmly

tie it—to that input source. The body model is also philosophically interesting, because it's the only image in our mind of which you know the object of reference is always there. You may have a distorted representation of your body, but that thing is certainly not a hallucination. It is as if it had intrinsic meaning, as philosophers sometimes say; it has a guaranteed reference. Your body is always there.

Now, if one looks at scientific research about the human self model, one sees that sensorimotor loops play a very important role. For instance, if we reach for an apple, we need something scientists and philosophers call a body emulator. If you were to wait until you see the visual input—you see your hand moving toward the apple on the table—that would be much too late. You have to have an internal model that gives you a simulated feedback of how your arm would feel—what tactile sensations you would get if you moved like that.

So, in having fast, efficient, and flexible body movements, it turns out we need something like an [efference copy](#), a body emulator, something that tells the brain ahead of time if this is the correct movement, and what kind of feedback to expect. So, this also gives us the capacity to correct a hand movement on-line. If we see we don't move absolutely right, and we have to correct this line of reaching, we do this unconsciously through a body model we already have. We don't wait for the conscious visual input.

Many things show us that waiting for conscious experience, in many situations, wouldn't be such a good idea. For instance, 100 yard sprinters: if they waited for the conscious experience of the shot in the starter's pistol, the other guys would already be 1½ yards out. You react to an unconscious sensation that can be shown. Expert tennis players cannot play by conscious vision. These balls are just much too fast.

So, there is something like a much larger unconscious body model in us, and it

guides us in a lot of our unconscious behavior. A good goal keeper is exactly somebody who has trained certain moves so many tens of thousands of times that he doesn't have to rely on conscious experience anymore. That's what makes a good athlete—that he has trained his unconscious body model. And all this plays into the very special role of the body as a perceptual object.

Now, there are some situations where we are body-blind—we have no body information: for instance, if we wake up from anesthesia after a surgery. I have tried this. For me it hasn't worked. But in the scientific literature you find many people have out-of-body experiences in the wake-up phase after anesthesia. They have experiences of floating; of a second body. Some have experiences of looking down.

Somebody lying on the street after an accident, you have exactly the same situation. You are cut off from this perceptual object, the body. The brain is trying to figure out what is going on, and it confabulates a second body which has exactly the same shape, often. But, for instance, it has no weight sensations, because there are no weight sensations. So, the very natural conclusion is, 'Wow, I'm light.' (Just think of flying dreams.) 'I must be able to fly.' And so on, and so forth.

Dr. Campbell: We are just about out of time. You've got so many great ideas in your book that we haven't even gotten to. You could probably have a whole conversation on the ethical aspects in the last part of your book. Is there anything you really want to tell my listeners that we haven't had a chance to talk about?

Dr. Metzinger: One thing I think we have to take care of is that we're living in a historical epoch. There is something happening that many people like to repress. I call this the naturalistic turn in the image of man. That is, our image of ourselves is changing through all of this research, whether we want it or not.

And this new image of man is a departure from many traditional images of man. It looks like everything—even our mental psychological properties—is the result of an entirely natural bottom-up process of dynamical self-organization over millennia.

We must come to terms, for instance, with the insight that not only our genes and our bodies are results of a process that knew no foresight. Evolution was driven by chance events. Evolution is a process that has no direction and no goal. But now, through evolutionary psychology and neuroscience, we learn that even our mental properties are results of a process that had no direction—that pursued no goal. If you think about this more deeply, it's hard to come to terms with.

So, we are going to gain a lot through all this new knowledge. For instance, there will be advances in psychiatric medicine. We will be able to heal mental illnesses better in 20 to 50 years. There are a lot of good things coming to us. But there's also a price to be paid. And the question is, what will be the psychosocial cost?

How will the general population react to this new understanding of ourselves as entirely natural, very likely mortal, beings? Will there be an escape back into fundamentalism, or will there be something like vulgar materialism flowering in society—a primitive form of hedonism? We all have to think what we want to do with all this knowledge together, and the new potentials for action.

Because something that is coming out of neuroscience—and that's the last thing I actually want to draw your listeners' attention to—is [neurotechnology](#). We will gradually, but better and better, be able to inference not only the brain, but consciousness itself. Neurotechnology will slowly blend into consciousness technology, and we will be able to control states of subjective experience in ever more fine-grained and reliable manners in the future. And there is no way around old-fashioned philosophical questions.

We have to ask, not only what is a good action, but we have to ask what is a good state of consciousness. What states of consciousness do we want to show our children? What states of consciousness should be illegal in our societies, if any? What states of consciousness can we force upon animals, for instance, in research? What states of consciousness do we want to foster and cultivate in our societies. And, perhaps, what is the state of consciousness I want to eventually die in?

So, there are not only scientific questions, there are also normative questions. And they are not just what is a good action in applying new technology to the brain. In the end it is also the question, what is a good life, given all this new knowledge about ourselves, and all these new potentials for action.

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As always, I want to thank my guest, Dr. Thomas Metzinger, for taking the time to be on the *Brain Science Podcast*. If you want a transcript of Dr. Metzinger's interview, you will find it at brainsciencepodcast.com.

I want to take a moment to review a few key ideas. [*The Ego Tunnel: The Science of the Mind and the Myth of the Self*](#), was written for general audiences. The book is about how our brain generates consciousness. In this interview Dr. Metzinger mentions that there are several problems that scientists and philosophers are trying to solve.

In the book he discusses six key questions, although today he only mentioned three of these: the problem of the unity of experience, the problem of now, and the problem of subjectivity. After providing a rigorous overview of these problems, Dr. Metzinger focuses on three interrelated topics.

As he told us during the interview, he is most interested in how subjective experience is created. Because of this he has several chapters in his book devoted

to things like out-of-body experience, virtual reality, and dreaming. Finally, as we touched on near the end, he spends a large part of the book talking about the ethical implications of neuroscience advances in this area.

So, how does the brain generate our sense of self, or selfhood? During the interview we only touched on the surface of this interesting topic. We considered what can be learned from things like out-of-body experiences, the rubber hand illusion, and the full body illusion. Normally we have a strong sense of being in our body. This seems to be also connected to our sense of controlling our body.

These experiments demonstrate how dependent this is on sensory and motor inputs. Since out-of-body experiences can be generated by electrical stimulation of the brain, they do not require a supernatural explanation. Instead, they demonstrate the ability of our brain to generate plausible alternative models in the absence of normal sensory and motor inputs.

While there are certainly many unanswered questions, a picture is beginning to emerge. As we talked about back in [Episode 57](#) with neuropsychologist, Chris Frith, the brain creates a model of the world, and that includes a model of our physical body. It also includes our sense that we are somehow not our body, which is something that many people are reluctant to admit. That's one reason why Metzinger devotes the last chapters of his book to talking about ethical issues.

The Ego Tunnel is a rigorous discussion of consciousness, with an emphasis on subjectivity. I highly recommend it.

Before I leave, I have a few closing announcements. First I want to remind you that a new episode of *Books and Ideas* is available at booksandideas.com. It's an interview with best-selling horror writer, [Scott Sigler](#).

In this interview, we talk about how Scott incorporates science into his fiction,

and we talk about his most recent book, [The Rookie](#), which has been converted into a wonderful young adult novel. It's a great book to help turn the sports-loving young person in your life on to reading. At the end of the interview there is a coupon code that you can use to get a discount on the hard cover version of *The Rookie*.

Next month on the *Brain Science Podcast* my guest will be [Dr. Peter Whitehouse](#), author of [The Myth of Alzheimer's](#). Dr. Whitehouse is a geriatric neurologist, and he has spent over 25 years in Alzheimer's research. We are going to talk about how he thinks we should change our approach to brain aging. Don't be put off by the title. This is an episode you won't want to miss. And it's going to be the perfect episode to share with new listeners.

The premium version is going to include a second interview with Dr. Whitehouse's co-author, medical anthropologist, [Daniel George](#). This version will be available at [brainsciencepodcast.com](#) on April 1st, and the free version will come out on the second Wednesday in April, 2010.

Meanwhile, I would love to hear your feedback. Besides sending me email at docartemis@gmail.com, you can post comments in our Discussion Forum at [brainscienceforum.com](#), or on our [Facebook Fan page](#).

Don't forget to tell your friends about the show. Your blog posts, Twitters, and reviews on iTunes are very important, since word of mouth is my only advertising.

Thanks again for listening. I look forward to talking with you again very soon.

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Transcribed by [Lori Wolfson](#)

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